system in the supply of water to the internal tissues, forming a complete peripheral mantle of aqueous tissue.—"Ueber Poren n den Aussenwänden von Epidermiszellen," by H. Ambronn. An attempt to show that the origin of pits in the outer walls of epidermal cells is referable to undulations in the young walls, and that these pits are not to be regarded as the functional equivalents of those in the walls of internal tissues.—"Nachträgliche Bemerkungen zu den Befruchtungsact von Achlya," by N. Pringsheim. A further contribution to the controversy as to the sexuality of the Saprolegniæ.

Zweites Heft.—"Ueber das Vorkommen von Gypskrystallen bei den Desmidieen," by Alfred Fischer. An investigation of the crystals of Calcium sulphate already known to exist in *Closterium*; similar bodies are also found in other genera of Desmids. In *Staurastrum*, *Desmidium*, and *Hyalotheca* they are not found. The author concludes that they are to be regarded as an excretory product; when the quantity produced is small, it may remain dissolved in the cell-sap; when larger it appears as crystals.—"Ueber farbige körnige Stoffe des Zellinhalts," by P. Fritsch. This article deals with the "anatomical structure" of colouring granules, exclusive of chlorophyll, and without reference to their development. In the light of recent discoveries the chief interest of such bodies centres in their development, and their relation to the chlorophyll granules.—"Die Zellhaut, und das Gesetz der Zelltheilungsfolge von Melosira (Orthosira Thwaites) Arenaria Moore," by Otto Müller. A careful investigation of the succession of divisions as seen in this filamentous Diatom, which will throw light upon the process of multiplication of cells in other members of the group.

Drittes Heft.—"Untersuchungen über die Homologien der generativen Produkte der Fruchtblätter bei den Phanerogamen und Gefässkryptogamen," by L. Celakovsky. The author brings evidence from teratological specimens to bear upon the question of the homology of the integuments of the ovule with the indusium of the Fern-Sorus, with the object of establishing that homology.—"Untersuchungen über die Morphologie und Anatomie der Monokotylen-ähnlichen Eryngien," by M. Möbius. The main results of this investigation are that the similarity of the parallel-nerved species of Eryngium to the Monocotyledons lies only in the leaves and rhizomes; that it extends, however, beyond mere external characters, and may be recognised in the anatomical structure.

Bulletin de la Société des Naturalistes de Moscow, 1884, No. 1.—On the calculation of the average figures of relative wetness, by K. Weihrauch (in German). The author shows that the averages calculated by a mere addition of the observed values of $\frac{s}{k}$ do not give correct figures, and advocates a calculation consisting of an addition of all numerators (s) and of all denominators (k) separately, before making the division. He illustrates his method by several examples taken from the series of observations in the Caucasus. The paper will be continued.—What becomes of bile in the digestive tube? by Dr. A. Weiss (in French). The author confirms to some extent the well-known opinion of Prof. Schiff.—Materials for the flora of the Government of Tamboff, district of Tamboff, by Th. Ignatieff. The steppe flora is characterised, as usual, by the *Stipa pennata*, but the following plants, showing a passage towards a more southern flora, are met with:—*Adonis vernalis*, *Verbascum Phœniceum*, *Echium rubrum*, *Muscari leucophæum*, *Iris furcata*, *Fritillaria ruthenica*, and *Salvia nutans*. All these, which do not extend much north—they are not met with in the Moscow flora—are remarkable for the most vivid coloration of their flowers. The author gives a list of 464 plants found at Exthal.—Review of the generative organs of the males of Bombus, by General Radoszkowski (in French), with four plates.—Short description of a journey to Central Asia, lecture by N. Sorokine (in French). The author adds to his paper a very interesting chromolithographed picture representing a *saksaoul* forest (*Akabasis ammodendron*, Ledebour) of the Kyzyl-kounis deserts. It is for the first time that we find in print so good a representation of this plant as it covers the *bar-khans*, or sandy downs, of the Steppe.—Researches into the histology of the hair, the bristle, the prickle, and the pen, by W. Lwoff (in German), with four plates.—Notice on the hypotheses as to the origin of Lake Baikal, by W. Dybowsky (in German). The recent discovery in Lake Baikal of the very same sponge (*Lubomirskia baicalensis*) which is met with in the Bering Sea leads to the conclusion that it has immigrated into Lake Baikal from this sea. On the other side, several explorers of Siberia, and recently again M. Cherski, have shown that there are no traces of a marine communication of Lake Baikal with the sea during and since the post-Pliocene period; but there are very numerous traces of large lakes connected formerly by broad rivers, and it would seem probable that the sponge might have immigrated by this way. Dr. Dybowsky leaves the question open.

Bulletin de l'Académie Royale de Belgique, November 8, 1884.—On certain phenomena of reduction produced in grains when germinating, and on the formation of diastase, by M. A. Jorissen.—On the quadrilinear form and surfaces of the third order, by Prof. C. Le Paige.—Verbal communication on the phenomenon of stellar scintillation, by Ch. Montigny.—On the advanced vegetation observed in the spring of 1884 at Longchamps-sur-Geer, by Baron de Selys Longchamps.—On the chemical composition of krokydolite, and on the fibrous quartz of South Africa, by A. Renard.—On the Chinese philosopher, Lao-tse, a predecessor of Schelling in the seventh century, B.C., by M. C. de Harlez.—An ambassador of the Duke of Alençon at the court of Queen Elizabeth, by Baron Kervyn de Lettenhove.—On a portrait of Van Dyck's grandmother in the Este Gallery, Modena, by Henry Hymans.

Atti della R. Accademia dei Lincei, July 1884.—On the co-existence of different empirical formulas, and in particular on those containing the capillary constant of fluids or the cohesion of solids, by Adolfo Bartoli.—Report of the committee appointed to rearrange the Corsini Library recently acquired by the Academy. This valuable library was found to comprise altogether 39,082 works, including 5903 Elzevirians, Aldines, and other old and rare editions, 2511 MSS. and 191 volumes of music, besides 116 portfolios of engravings and 17,733 prints and drawings.—Meteorological observations made at the Royal Observatory of the Capitol during the month of June 1884.

Rivista Scientifico Industriale, October 31, 1884.—Variations in the electric resistance of solid and pure metallic wires under variations of temperature, by Prof. Angelo Emo.—Boulier's pyrometer, described and figured by M. Lauth.—The gigantic fossil turtle of Verona, described by S. Capellini.

November 15-30, 1884.—Variations in the electric resistance of solid and pure metallic wires under variations of temperature (continued); part 2, original determinations of the electric resistance of the chief metallic wires under different temperatures, by Prof. Angelo Emo.—On the oxidation of sulphur by ozone, by S. Zinno.—The Ammonites of the province of Venice, described and figured by T. A. Catullo.

SOCIETIES AND ACADEMIES

London

Geologists' Association, January 2.—On some recent views concerning the geology of the North-West Highlands, by Henry Hicks, M.D., F.G.S., President of the Association. The author stated that as the *Proceedings* of the Association contained several papers dealing with the controversy concerning the rocks of the North-West Highlands of Scotland, he thought it advisable to call the attention of the members to views contained in an important article published in NATURE (p. 29) by the Director-General of the Geological Survey, and in a "Report on the Geology of the North-West of Sutherland," by Messrs. Peach and Horne, in the same number, which cannot fail either to change entirely the future character of the controversy, or bring it rapidly to a satisfactory issue. Because of the positions held by the chief disputants on the one side, the controversy had assumed, to a great extent, the appearance of being one between official surveyors and some amateurs, who had been led to study the questions involved in it. The well-known and widely-accepted views first put forward by Sir R. Murchison, that there were clear evidences in the North-West of Scotland of a "regular conformable passage from fossiliferous Silurian quartzites, shales, and limestones upwards into crystalline schists, which were supposed to be metamorphosed Silurian sediments," were fully adopted by the official surveyors, including Sir A. C. Ramsay and Prof. Geikie, also by the late Prof. Harkness and others, who had examined the areas. Prof. Nicol, of Aberdeen, however, for many years stoutly contested Sir R. Murchison's views, and maintained that they were based on erroneous observations. Unfortunately, at that time his views did not meet with much approval. In the year 1878 the author re-opened the contro-

versy by calling attention to some sections examined by him in Ross-shire, which he maintained did not bear out the views of Sir R. Murchison. He also suggested a modified interpretation of the views of Prof. Nicol. Since then many areas in Ross and Sutherland have been examined by Mr. Hudleston, Prof. Bonney, Dr. Callaway, Prof. Lapworth, and Prof. Blake, and their conclusions showed that though differences of opinion prevailed on some points, yet all were agreed as to there being no evidence in the areas examined by them to support the Murchisonian view of a conformable upward succession. Many other facts of great importance were brought out in these inquiries. The author expressed gratification at the candid manner in which the whole question had been dealt with by the Director-General and the Surveyors in their recent report, and at their readiness in acknowledging, after due examination in the course of surveying and mapping parts of the areas referred to, that they had found the "evidence altogether overwhelming against the upward succession which Murchison believed to exist."

Edinburgh

Mathematical Society, January 9.—Mr. A. J. G. Barclay, President, in the chair.—Prof. Chrystal read a paper on the problem to construct the minimum circle enclosing n given points on a plane; Dr. Thomas Muir discussed the equation connecting the mutual distances of four points on a plane; and Mr. J. S. Mackay gave two notes on a theorem and a problem in geometry which had previously been brought before the Society.

Paris

Academy of Sciences, January 5.—M. Bouley, President, in the chair.—Obituary notice of M. Victor Dessaignes, who died at Vendôme on January 5, by M. Berthelot.—Chemical studies on the skeleton of plants, part iii., by MM. E. Fremy and Urbain.—Note on the earthquakes in the south of Spain, by M. Hébert. These disturbances, the most serious that have been recorded throughout the historic period in Spain, are attributed exclusively to local causes, and especially to the structure of the soil, which is here formed of secondary strata, folded, overlapped, broken by numerous faults, and often traversed by old and recent eruptive rocks.—On a hydrate of chloroform, by MM. G. Chancel and F. Permentier.—Studies in the reproduction of phylloxera; distribution of the sulphuret of carbon amongst the vines by means of machinery, by M. P. Boiteau.—Equatorial observations of Barnard's and Wolf's comets made at the Observatory of Algiers (0.50 inch telescope), by MM. Trépied and Rambaud.—Observations of Encke's comet made at the same observatory, by M. Trépied.—On the internal constitution of the globe, by M. O. Callandreau.—On a generalisation of the theory of Abel, by M. H. Poincaré.—On a method of treating universal periodical transformations, by M. S. Kantor.—Note on the theory of electro-dynamic induction, of which the integral law is given by Neumann's theorem, by M. P. Duham.—A new theorem on the dynamics of fluids, by M. E. F. Fournier.—On the laws of chemical dissolution, by M. H. Le Chatelier.—Determination of the atomic weights of carbon, phosphorus, tin, and zinc, by M. J. D. Van der Plaats.—On the saturation of phosphoric acid by the bases, by M. A. J. Joly.—On the preparation of pure and highly concentrated oxigenated water, by M. Hanriot.—On fusibility in the oxalic series, by M. L. Henry.—Heat of combustion of acetal, crotonic aldehyde, isobutyric acid, and of some other substances of the fatty series, by M. W. Louguinine.—On the germination of plants in soils abounding in organic substances, but free from microbes, by M. E. Duclaux.—Observations on the previous paper, by M. Pasteur.—Fresh researches on the doundaké plant (*Cephalina esculenta*, Schum.), and on its active principle doundakine, by MM. E. Heckel and F. Schlagdenhauffen. The doundaké is described as an astringent and a febrifuge capable of replacing quinine, as well as a dye yielding a beautiful yellow colour worthy of the attention of dyers. It flourishes in Senegambia, Sierra Leone, and other parts of West Africa, and in many respects closely resembles the Morinda of the South Sea Islands.—On the presence of the genus Equisetum in the lower coal-measures of Beaulieu, Maine-et-Loire, by M. Ed. Bureau.—Influence of altitude on vegetation and the migration of birds of passage, by M. Alf. Angot.

Berlin

Physiological Society, December 12, 1884.—Prof. Eulenburg spoke on investigations into the sense of temperature, which he had instituted specially for diagnostic purposes. As a test of the cutaneous perceptions in this respect, the only method available in practice was that of ascertaining the least differences perceived, and for this purpose the speaker had constructed special instruments which could be used to examine the sense of pressure as well as of temperature on the part of the skin. These instruments he laid before the Society. The apparatus for testing the sense of temperature consisted of two mercurial thermometers fastened on a transverse piece, with flat discoid tubes, one of which was fixed, the other movable. The fixed tube was surrounded at its lower part with metallic wires, by means of which, and an electric current, it could be warmed at pleasure. Both were placed beside or after one another on the spot to be examined, and the least difference of temperature which could be perceived was ascertained. When the temperature of the skin was below 27° C., its sensitiveness both to heat and cold was too obtuse for available results to be attained. In order to determine a normal scale above this limit, Prof. Eulenburg carried out a large number of measurements, which resulted in showing a great diversity in sense of temperature at different parts of the body. The sensitiveness to warmth was highest at the forehead and at the dorsal side of the last phalanges. At both these places differences of 0·2° C. were distinctly perceived. The least sensitiveness to warmth, on the other hand, was shown at the higher end of the anterior side of the upper part of the thigh, at the epigastrium, and in the median line of the back. At these places, only differences as large as from 0·9° C. to 1·1° C. were perceived. Sensitiveness to cold was likewise greatest at the forehead, and least at the epigastrium and back, but the degree of sensitiveness to cold did not always coincide with that of thermal sensitiveness at particular parts of the body, certain spots showing more sensitiveness to differences of heat, others to differences of cold. From the circumstance that the sense of temperature was more developed in the hands and face, which were exposed, than in those parts usually covered, and so far protected from variations, the speaker thought he was justified in inferring that the more delicate sense of temperature was an acquired sense. It was a striking fact that the tip of the tongue, so keen to mark variations of taste, was very dull in distinguishing variations of temperature. While engaged in these investigations Prof. Eulenburg became acquainted with the labours of Dr. Goldscheider, who, in the same manner as Herr Blix had done somewhat earlier, but, independently of this gentleman, came to the conclusion, as the result of a series of experiments, that the perceptions of temperature on the part of the skin had their seat in a large number of distinct cold and warmth points distributed over the whole body in definite complicated arrangement, the former of which (the cold points), under chemical as well as under electrical and mechanical stimulus, generated only the feeling of cold, the latter, under the same stimuli, only the feeling of warmth; that at all parts of the body there were a number of cold points which were easy to identify, and which were called cold points of the first class; and that, in addition, there were a larger number of cold points, more difficult to identify—cold points of the second class. Prof. Eulenburg repeated Dr. Goldscheider's experiments, and found them generally confirmed. He had further studied the distribution of the warm and cold points, both in himself and other persons, in such a manner that he marked with a fine pencil on the skin each warm or cold point found during examination, and then had an impression of the points so found made on wax paper, which he had laid over them. As a result of this operation it appeared that the forehead and the dorsal side of the phalanges had the most, the epigastrium the fewest, cold points. If the same spot of skin were examined on different days, the cold points of the first class always remained the same, while those of the second class varied, being found in larger number on one day than another. This diversity on different days appeared to coincide with the changes of temperature in the skin. The same relations held good in regard to the warmth points, which were separated locally from the cold points by tracts thermally insensible. The distribution of cold and warm points was not the same on all parts of the body. In some places the number of cold points predominated, in others the number of warm points. In the back of the hand, near to the wrist, for example, the number of warm points was in a majority, while towards the fingers the number of cold points preponderated. On comparing symmetrical parts of the body, it appeared that neither in number nor in the way in which they were distri-

buted did the cold points on one side resemble those on the other. Prof. Eulenburg further confirmed Dr. Goldscheider's conclusions that in particular parts of the skin, between the cold and warm points, lay the points of pressure which were sensitive to touch but not to differences of temperature. The existence, on the other hand, of special points for perceiving pain due to temperature the speaker had been unable to verify. Under the stimuli inadequate to temperature feeling, as the electrical and mechanical, he had tried the electric current with positive results. A moderate stream, producing in the skin the well-known prickly feeling, having by means of a pointed electrode been introduced into a cold point, generated a decided feeling of cold. Mechanical stimuli, which should produce the same effect, failed, however, in Prof. Eulenburg's experiments to do so.

Physical Society, December 19, 1884.—Prof. Lampe gave some interesting historical notes on the calculations respecting solids of attraction, the results of which he had communicated at the sitting of November 21. In these problems he had started with a solid of greatest attraction, in regard to which Gauss had laid down the law that its attraction was related to that exercised by the same mass in globular form on a point of its surface, as $3 : \sqrt[3]{25}$. This law was found briefly adduced in a note in Gauss's treatise on capillarity, without any proof either there or anywhere else. Although Prof. Schellbach, who in 1845 calculated the form of the body of greatest attraction, ascribed the adduced law to Gauss, yet Prof. Lampe, in consideration that Gauss did not prove the law referred to and introduced it with the word "constat," was of opinion that it must have been already proved before the time when it was cited by Gauss. He had now, then, in point of fact, succeeded in tracing the author of the law. It originated, namely, with John Playfair, who, in 1809, in a treatise "On the Solid of Greatest Attraction," had calculated the form of such a body, and with reference to the magnitude of its attraction had arrived at the result already stated. In the same treatise John Playfair had dealt with a part of the problems brought before the Society by Prof. Lampe, and in respect of the cone and cylinder had come to the same results as himself. In calculating, however, the attraction of an ellipsoid flattened at the poles, he had, as was shown more at large by the speaker, committed an error, in consequence of which he had arrived at the conclusion that in the case of any eccentricity of the meridians the attraction was less than in the case of eccentricity 0, that is, than in the case of a globe. The fact, on the other hand, was that with oblateness the attraction at first increased and approached to that of the solid of greatest attraction, though yet without ever quite reaching it. It then diminished, till finally it sank to 0, when the pole coincided with the middle point. Let the attraction of a homogeneous mass in globular form be equal to 1, then the greatest attraction which this mass was in any case able to exercise was equal to 1·025986, while the maximum of attraction in an oblate rotatory ellipsoid was equal to 1·02213. Whether John Playfair's error had been already elsewhere observed or corrected was not known to the speaker. Altogether John Playfair's treatise appeared to have lapsed into oblivion, seeing that in the manuals of mechanics the law of maximum attraction being to the attraction of a ball as $3 : \sqrt[3]{25}$ was universally imputed to Gauss, and the calculations of the solid of greatest attraction, which John Playfair had already worked out, to Schellbach.—Following up this address Dr. Kœnig communicated the plan of an investigation which he contemplated carrying out in conjunction with Dr. Richarz. The investigation had for its object to determine with greater precision than had hitherto been done the mean density of the earth. The most exact measurements hitherto taken on this question came, as was known, from Herr von Jolly, in Munich, who, in a high tower, experimented on a balance, on one scale of which hung a wire, 21 m. long, bearing another scale at the bottom. After balancing a body in the upper scale and then transferring it to the scale 21 m. lower, the body was found to be somewhat heavier in the latter case in consequence of the more powerful attraction there exercised on it by the earth. On next placing under the lower scale a lead ball weighing 110 centner, and repeating the experiment, he found a greater increase on the upper scale weight than in the first instance. From the relation of these augmentations of weight and the volume and specific weight of the lead ball, Herr von Jolly calculated the mean density of the earth. Such a mode of measurement, however, laboured under this unavoidable source of error, that there was no means of safe-guarding the long wire from differences of temperature. Dr. Kœnig and Dr. Richarz had now, independently of each other, devised another method of utilising the balance for the purpose of determining the mean density of the earth. Instead of placing the lead ball 21 m. under the upper scale, they brought the heavy body directly under the upper scale, whence a line, passing through a perforation of the heavy mass, bore the lower scale immediately underneath it. When, now, a body was weighed in the upper scale, the mass of lead acted in a sense similar to that of the force of gravity, and its attraction was added to gravitation. When, on the other other hand, a body was weighed in the lower scale, the mass of lead operated in an opposite direction, and its attraction was subtracted from gravitation. By this experiment, therefore, a double effect was obtained from the mass of lead instead of the single effect in Herr von Jolly's experiment. Again, by bringing a second equally large mass of lead under the scale of the other side, disposing it in the same manner as the first mass, the effect of the mass of lead might be multiplied fourfold. An equilibration might be made by placing the weight on one side in the upper, on the other side in the lower, scale. Then the weights might be transposed. Independently of the advantage of a fourfold comparative estimate of the attraction of the mass of lead, all disturbances due to differences of temperature were by this method entirely obviated. The precision of the measurement would be still further enhanced by using a mass of lead of 2000 centner. The total mass of lead would compose a block, the most suitable form for which had yet to be theoretically determined. In the centre, above this block, would stand the balance, and the wires of both scales would pass through two equal perforations, at the ends of which, under the block, would depend the two lower scales. The construction of such a block of lead would be rendered possible by making it consist of 1300 separate pieces capable of being joined together into the form desired, and after a series of experiments they might be fitted up anew, so as to secure compensation for any errors due to unequal interior structure of the blocks. Of these masses of lead a parellelopiped would have a side of 2·5 m. and a height of 1·5 m. As was self-evident, the precision of the balance was a matter of extreme moment for these measurements. The mechanist who had undertaken their construction had engaged to produce a sensitiveness of one-hundred millionth for the weight of 1 kg. used in such measurements. He had further engaged, by an adequate modification of the construction, to obviate the error arising from the circumstance that the edges never corresponded mathematically with that term, but had always more or less diameter, so that with the inclination of the beams the plane of support changed. Dr. Kœnig hoped to be able in the course of a year to announce the numerical results of the experiment.

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